

ON SOME RECENT GASTROPODA REFERRED TO THE FAMILY  
TURRITELLIDÆ AND THEIR SUPPOSED RELATIONSHIP TO  
THE MURCHISONIIDÆ.

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PLATE V.

THE object of this paper is to draw special attention to some recent Gastropoda which bear considerable resemblance to certain fossil forms referred to the family Murchisoniidae. In several of my papers on the Palæozoic Gastropoda I have alluded to them, but it has been suggested that if they were brought to the notice of this Society it might lead to an effort being made to obtain the animals as well as the shells, and thus a complete study might be achieved which would teach us their true affinities.

In January, 1881, Mr. Marrat first pointed out to me in the Liverpool Museum an elongated shell having a deep sinus in the outer lip, that had been collected by Captain Cawne-Warren in Bass Strait. This he had named in manuscript *Murchisonia fissurata*. The Rev. R. Boog Watson described this same species under the name of *Turritella accisa*,<sup>1</sup> and afterwards figured and more fully described it, and some allied species, in the "Voyage of H.M.S. 'Challenger.'"<sup>2</sup> From a paragraph in Catalogue iv of the Museum Godeffroy, Hamburg, p. xx, as far back as 1869, it appears that there was a shell in that collection with a deep sinus, that had been dredged by Captain Schultze in Bass Strait, and referred to the genus *Murchisonia*, but it was imperfect, and the actual specimen is not now known, though there are many examples having a deep sinus in the collection from the same locality. Unfortunately the animals which formed these shells were either not obtained, or else not preserved, so that in considering their affinities we can at present be guided only by the characteristics of the test.

Although these shells bear a great general resemblance to both *Murchisonia* and *Turritella*, they have in reality features which distinguish them from the types of each of these genera. The genus *Murchisonia*, as is well known, was first created by D'Archiac and De Verneuil in 1841,<sup>3</sup> and is especially characterized by having a deep narrow slit in the outer lip, the filling up of which during

<sup>1</sup> Journ. Linn. Soc., Zoology, vol. xv (1881), p. 220.

<sup>2</sup> Rep. on Gasteropoda, Zoology, vol. xv (1886), p. 466.

<sup>3</sup> Bull. Soc. géol. France, tom. xii, p. 154.

growth gives rise to the formation of a distinct band on all the whorls similar to that on *Pleurotomaria*. The aperture, instead of being rounded, as in the latter genus, is oblong, its length equalling about twice the width, and it is slightly channelled below. The type, *Murchisonia coronata*, Goldf., is regarded by Mr. Whidborne as one of the numerous varieties of *M. turbinata*, Schlot., which are all more robust shells, with more rapidly increasing whorls, than any of the recent forms. These last are also further distinguished by having merely a deep sinus, instead of a slit in the outer lip, and this sinus never gives rise to the formation of a distinct band, the lines of growth continuing from suture to suture without break; the aperture is shorter, being more or less quadrangular, and very slightly channelled below.

There are many genera with a sinus in the outer lip, to which it is not here necessary to refer, because they differ greatly in other characteristics from the shells under consideration.

Several groups, however, have been placed in the family Murchisoniidae, that have a sinus and not a slit in the outer lip, and consequently no distinct band on all the whorls, viz.: *Ectomaria*, Koken, *Pseudomurchisonia*, Koken, *Hypergonia*, Donald, etc. In *Ectomaria* the shell is slender, ornamented by spiral keels, the sinus is situated rather low in the outer lip, and it does not form a band on any of the whorls. *Pseudomurchisonia* has merely a sinus in the earlier whorls, but in the later ones this gives rise to a band. *Hypergonia* is characterized by a more or less slender form ornamented with keels, a sinus in the upper part of the outer lip situated between two of the keels, and by the absence of a distinct band. The outer lip of the recent shells advances, and the sinus is deeper at the margin than the form of the lines of growth on the whorls would lead one to suppose. It is therefore very difficult to make a just comparison with fossil groups, in which the aperture is rarely entire. A notable exception occurs in the case of *Murchisonia subsulcata*, De Kon., in which the outer lip is remarkably well preserved, and the sinus is very similar in character and depth to that of *Turritella accisa*, Watson, and *T. runciata*, Watson, being deeper than the lines of growth indicate. It, however, almost amounts to a slit, and is more definitely limited by strong raised threads on the whorls. This is not, however, a typical species of *Murchisonia*, but belongs to the section *Aclisoides*, Don.

No trace of an inner naereous layer such as exists in *Pleurotomaria* has been observed either in the true *Murchisonia*, or in any of the forms having a sinus associated with them. This is also the case with the recent shells. No opercula have been discovered. In their slender form they agree with *Turritella*, but the characteristic species of that genus have the outer lip merely broadly sinuated instead of having a deep sinus; the aperture is also rounded below instead of being slightly channelled, and the columella is less produced. In the section, or subgenus *Toreula*, Gray, however, the outer lip has a decided sinus, but the base of the aperture differs in being excavated, and the columella also is short instead of being produced.

Certain species referred to the section *Haustator*, Montf., instead of having the outer lip merely sinuated as in the type, have a broad shallow sinus, viz., *Turritella rosea*, Quoy, *T. eingularata*, Sby., and *T. eingularifera*, Sby. *T. australis*, Lam., has also a broad shallow sinus in the outer lip, and has been referred by Kobelt, with a query, to *Zaria*, Gray, but the form of the aperture in that section is different, and the species agrees more in character with those just mentioned.

These shells with a broad shallow sinus are evidently closely related to the type of *Turritella*, and are quite distinct from those with a deep sinus; but it remains to be decided in what degree the latter are related to the genus. This can only be ascertained by a minute and detailed examination of the animals. Similar investigation of the animals of the types of *Turritella*, and the various sections referred to that genus, is also necessary, in order that it may be ascertained whether any special structural features are associated with the differences in the form of the aperture. Hitherto these detailed comparisons do not appear to have been made. Data will thus be furnished for determining the affinities of fossil shells having analogous forms.

Elongated Gastropoda having a sinus, or slit, in the outer lip occur at a very early epoch, being abundant in the Palæozoic Period in company with the shorter Pleurotomariæ. Unlike these latter, however, which reached their maximum in the Jurassic Period, and continue up to the present time, being now represented by five species, *Murchisonia* and its associated forms became almost, if not entirely, extinct after the Triassic Period. The only shells which at all resemble them are *Disoketa Mœyeri*, Gardner, from the Gault, which possesses two channels bordered by slightly elevated keels, and the genus *Murchisonella*, Mörch, species of which occur in the Eocene beds near Paris, and living at the Island of St. Thomas, West Indies. This last genus is referred to the Turbonillidæ, because the protoconch is heterostrophe.

Special interest therefore attaches to these recent shells with a deep sinus, and it is to be hoped that some light will soon be thrown on the structure of the animals, as in the recent Pleurotomariidæ. The studies of Dall, Fischer, Bouvier, and others show, as might be expected, that the anatomy of these latter is of a primitive type.

The number of recent shells with a deep sinus in the outer lip that have been described up to the present is seven, viz.: *Turritella acceisa*, Watson, *T. runcinata*, Watson, *T. deliciosa*, Watson, *T. cordisimei*, Watson,<sup>1</sup> *T. sinuata*, Reeve,<sup>2</sup> *T. Sophia*, Brazier,<sup>3</sup> and *T. Higginsii*, Petterd.<sup>4</sup>

There are three specimens of *T. acceisa* in the British Museum (Natural History) dredged by the "Challenger" off East Monecœur Island in 38-40 fms., and also three other examples which are

<sup>1</sup> "Challenger" Reports, Zoology, vol. xv (1886), pp. 469, 471, 475, 476.

<sup>2</sup> Conch. Icon., vol. v (1849), pl. xi, fig. 62.

<sup>3</sup> Proc. Linn. Soc. New South Wales, vol. viii (1883), p. 227; vol. ii (1877), p. 262.

<sup>4</sup> Journ. Conch., vol. iv (1884), p. 135.

probably this species, marked 924; they are much faded, and were obtained at a depth of 40 fms. in Bass Strait. Besides these there are six individuals in the Liverpool Museum from Bass Strait, and I was enabled to obtain two examples in exchange from the same locality. Two of the Liverpool shells are better preserved than any others I have seen, the outer lip being entire. One, consisting of fourteen whorls, has a length of 35 mm., width 12 mm., sinus in outer lip about 5.5 mm. in depth. The other shows a sinus of much the same relative depth. There are also twelve specimens in the Natural History Museum at Hamburg, but none of them are in particularly good condition. Nine were originally in the Museum Godeffroy, and all are from Bass Strait except two, of which the habitat is unknown. The general character of *T. runcinata*, as well as the form of the sinus, greatly resembles *T. accisa*. Only three specimens of this species were dredged by the "Challenger," at a depth of 38-40 fms. in sand and shells off East Monocœur Island. None of them have the outer lip entire, and the sinus is only indicated by the lines of growth. In the Natural History Museum, Hamburg, there are five specimens which were all originally in the Museum Godeffroy; two good examples, showing the sinus in the outer lip, were named *Murchisonia sutoris* in manuscript by Dunker. One of these is the largest I have seen; it consists of sixteen whorls, and measures 40 mm. in length, 13.5 mm. in width, while the sinus is about 6.5 mm. in depth. Another example is remarkably well preserved, having the sinus perfect; it consists of fifteen whorls having a length of 36.5 mm., the greatest width being 12.5 mm., while the sinus is about 5 mm. in depth. Dr. Pfeffer informs me that all the shells in the Godeffroy Collection were dredged by Captains Schultze, Pohl, and Witt in Bass Strait, and that the best were probably obtained by the latter, but unfortunately no particulars are preserved.

*T. deliciosa* and *T. cordisimei* are immature, therefore the actual depth of the sinus cannot be ascertained. The former was dredged at a depth of 155 fms. off Raine Island, Torres Strait, the latter off East Monocœur Island at 38-40 fms. Such minute descriptions of these species are given by the Rev. R. Boog Watson that it is unnecessary for me to say more about them here. Figures of *T. accisa* and *T. runcinata*, however, are given (Pl. V, Figs. 4, 5, and 7) to show the form of the aperture with its characteristic sinus.

In the British Museum (Natural History) there are four specimens in the Cuming Collection of *T. sinuata* from deep-water off Sydney, six from Stewart Island, and two from New Zealand. The sinus is not so deep as in *T. accisa* and *T. runcinata*, but it is well marked, and the general form of the aperture is similar. Seven examples have the sinus well preserved, showing that it varies slightly in depth and width. An average-sized specimen consists of fourteen whorls, which measure 16 mm. in length, 5.5 mm. in width, the sinus being about 1.75 mm. in depth. *T. Sophia* was dredged off Port Jackson Heads at a depth of 45 fms. and was first described by the Rev. J. E. Tenison-Woods as *T. incisæ*, but that name being

preoccupied, it was afterwards called *T. Sophie* by J. Brazier, who states that it also occurs off Sydney in deep water. This species has not been figured; it is said to consist of thirteen whorls, which have a length of 11 mm. and a width of 3 mm. It is especially distinguished by the narrow and deep sinus in its outer lip, which is stated to extend 4 or 6 mm. from the aperture. If this measurement be correct, the sinus must run almost completely round the whorl, and thus be the deepest known. Mr. Hedley informs me that there is another example of this species in a collection in the Sydney Museum which he intends to describe, and we hope that he will figure it. *T. Higginsi* has not been figured, and the description is so brief that it is difficult to tell whether it is really distinct from all the other described species. The shell consists of fifteen whorls in a length of 30 mm., and has a very deep sinus in the outer lip. It occurs off Tamar Heads, Tasmania. Besides the seven species here enumerated, I am describing three new ones with a deep sinus, one with a broad shallow sinus, and a variety of this last.

Before giving the formal description of these, I think it well to draw up a general summary of the characters of the shells with a deep sinus.

## Family TURRITELLIDÆ.

### Section COLPOSPIRA, n.sect.

Shell elongated, turreted, composed of numerous whorls. Ornamentation consisting of keels and spiral threads, and frequently a strong ridge or angle above and below the suture. Aperture subquadrate, rather longer than wide; outer lip arched obliquely backwards above a deep sinus, then produced prominently below the sinus, and curved round to meet the columella, where it is slightly canaliculated. Inner lip spread on the body-whorl. Columella produced and almost straight.

This section is distinguished from the type and other sections of *Turritella* by the deep sinus in the outer lip, by the lower part of the lip being more produced forwards, by the columella being longer and nearly straight, and by the aperture being slightly channelled below. The sinus resembles that of certain forms hitherto referred to the family Murchisoniidae. It is, however, quite distinct from the type of *Murchisonia*, the line bounding the sinus continuing from suture to suture without the break made by the slit in that genus, and no band is formed. Thus there must have been merely a fold in the mantle of the animal, and not a slit as in *Murchisonia* and *Pleurotomaria*. It seems advisable to regard this as a section of *Turritella* until the animal is known.

It must be noted that all the species of this group at present known have been dredged off the coasts of Australia, Tasmania, and New Zealand at depths varying from 38 to 410 fms.

*Type.*—*Turritella runcinata*, Watson.

1. *TURRITELLA* (*COLPOSPIRA*) *SMITHIANA*, n.sp. Pl. V, Figs. 1-1c.

Shell small, turreted. Apex blunt, protoconch consisting of about two smooth, rounded whorls. Whorls eleven or twelve, convex or slightly angular, increasing gradually. Ornamentation consisting of four strong keels with an additional one on the body-whorl, and numerous fine threads on the base and between the keels. Aperture imperfectly known, apparently sub-quadrate, rather longer than wide, slightly channelled below. Inner lip reflected on the body-whorl. Outer lip, as indicated by the lines of growth, possessing a deep and rather wide sinus situated between the second and fourth keels, but not limited by either. Columella nearly straight, being but slightly curved. Umbilicus closed. Base rather convex.

The largest specimen, which is nearly entire and consists of eleven whorls, is 9.5 mm. in length and about 3 mm. in width. Another would be larger if perfect, but the body-whorl is broken. The sinus of an individual measuring about 2.5 mm. in width is about 1.25 mm. in depth, as indicated by the lines of growth: it would probably be deeper if the lip were entire.

Dredged by H.M.S. "Challenger" off Sydney, at a depth of 410 fms.

Mr. Edgar Smith had marked this as a new species, therefore I name it after him. There are about forty-two specimens in the British Museum (Natural History), nearly a dozen of which are fragments, and none have the aperture entire. They are all dead shells, and of a creamy-white colour. There are fifteen examples with the protoconch, but none of them show its junction with the succeeding whorls very clearly. The one figured is slightly worn at the junction, and the post-embryonic shell probably began rather sooner than appears. The whorls vary slightly in angularity according to the prominence of the central keel. This species is distinguished from most of the other members of the group by the less flattened whorls and the five strong keels. The sinus also is rather wider in proportion to the size of the shell than that of *T. accisa* and *T. runcinata*. In this feature, as well as in the form and ornamentation of the whorls, it agrees with *C. Godeffroyana*, from which it differs in its smaller and more slender form, and in having an extra keel.

2. *TURRITELLA* (*COLPOSPIRA*) *CRENULATA*, n.sp. Pl. V, Figs. 2-2b.

Shell very small, turreted. Protoconch composed of about two smooth, convex whorls. Whorls eleven, gradually increasing, flattened and somewhat quadrate in form. Ornamentation beginning immediately after the junction with the protoconch; it consists of four keels, of which the three uppermost are strongly and the lowest but slightly crenulated, the third keel is the strongest. There are also numerous fine threads on the base. Aperture imperfectly known. A deep sinus in the outer lip is indicated by the lines of growth, situated between the first and third keels. Inner lip reflected on the body-whorl.

Length 6.5, width 2 mm.

Dredged by the "Challenger" off Sydney in 410 fms.

There is but one example of this species in the British Museum (Natural History), and it is a dead shell of a creamy-white colour. It resembles *Turritella australis*, Lam., in form, but is less robust and has an additional crenulated keel; the sinus also is apparently deeper.

3. *TURRITELLA* (*COLPOSPIRA*) *GODEFFROYANA*, n.sp. Pl. V, Figs. 6-6a.

Shell turreted, composed of more than eleven gradually increasing, convex whorls. Colour pale amber. Protoconch unknown. Ornamentation consisting of three strong spiral keels, with an additional one below on the body-whorl, and numerous lines between the keels and on the base. The second keel is situated slightly below the middle of the whorl, and is much the strongest and most prominent, rendering the whorls somewhat angular. Sutures deep. Aperture sub-quadrangular; inner lip spread on the body-whorl. Columella nearly straight.

Length 17, width  $6\frac{1}{2}$  mm.

Dredged by Captain Witt in Bass Strait.

There is but one of this species in the Godeffroy Collection at the Hamburg Museum. The outer lip is not well preserved, and there are but slight indications of a sinus between the uppermost and the third keel, its greatest depth occupying the position of the strongest keel. Quite near the broken edge there are a few lines which appear to indicate the bottom of a sinus, and further back there is evidence of a break which has been mended by the animal, the course of which makes a line similar to the contour of the sinus on some of the other shells of this group; there is also another line behind the break running in the same direction. This shell comes very near the description given by Petterd of *T. Higginsi*, but as there is no figure of that species, and only a very brief description, a satisfactory comparison cannot be made. It is evidently larger, measuring 30 mm. in length; the colour is reddish brown, instead of yellowish amber; only three spiral keels are mentioned, the fourth on the body-whorl not being referred to, nor is the greater prominence of the second keel observed. *C. Godeffroyana* also somewhat resembles *C. Smithiana*, but the shell is larger, the whorls increase more rapidly, and the ornamentation is different.

4. *TURRITELLA* (*COLPOSPIRA* ?) *QUADRATA*, n.sp. Pl. V, Figs. 8-8b.

Shell pyramidal, composed of thirteen or fourteen whorls. Protoconch small, white, consisting of two smooth, convex whorls. The earlier six or seven whorls are but slightly convex, and flattened, the later ones are strongly ridged above and below the sutures, the space between the ridges being flat or slightly concave. The ornamentation consists of numerous strong spiral threads. The colour is light yellow flamed with brown, with deeper spots on the ridges. Aperture sub-quadrangular, rather longer than wide, outer lip thin, retreating and forming a broad but shallow sinus, advancing again and curving round to the base of the pillar, where it is slightly channelled.

Inner lip spread on the body-whorl. Columella straight. Base but slightly convex, with a subangularity below the lowest ridge.

Length of a medium-sized specimen 19 mm., width 6.5 mm. The depth of the sinus unknown, none of the examples being entire.

Two dead shells were obtained in Bass Strait at a depth of 45 fms. in coarse sand and dead shells. Two specimens in my own collection are from Tasmania and Port Jackson respectively. They were procured from Mr. Sowerby, who has three other examples. In the British Museum there is also another individual presented by Mr. J. H. Ponsoby from Diana's Basin.

This differs from other species of the section *Colpospira* in having a much broader and shallower sinus; it, however, agrees with them in the general character of the shell and the form of the aperture, more especially with *Turritella sinuata*, with which it has hitherto been confounded. The columella, as in that species, is even more nearly straight than in most of the species of *Colpospira* described, and it has not the twist backward of *Turritella runcinata* and *T. accisa*. In spite of the difference in the form of the sinus it appears advisable at present to place it in this section until we obtain some knowledge of the animal and learn whether any special structural characters are associated with the variation in the dimensions of the sinus. Should it prove to have distinctive features, *Platycolpus* would be a suitable name for a section of which it would be the type. *Turritella quadrata* is distinguished from *T. sinuata*, not only by its broader and shallower sinus, but also by its stronger ridges, the spiral threads not being so coarse comparatively as those on *T. sinuata*, and by their being differently disposed, and by the colour-markings being broader. Two specimens in the British Museum (Natural History) marked 906, referred to by the Rev. R. Boog Watson as similar to but distinct from *C. runcinata*, appear to belong to this species. They are larger, and are evidently dead shells, since the colour is much faded. The largest consists of thirteen whorls, and has a length of 24 mm.

5. *TURRITELLA* (*COLPOSPIRA* ?) *QUADRATA*, var. *SCITULA*, n.

Pl. V, Figs. 9-9a.

This seems to be a well-marked variety of *Turritella quadrata*, having more prominent ridges, and the space between rather more concave.

I have one specimen in my collection from Port Jackson. It consists of fourteen whorls, and has a length of 18.5 mm., width 6 mm. In the British Museum (Natural History) there is another individual, No. 87, dredged by H.M.S. "Challenger" off the same locality, at a depth of 30-35 fms. It is larger, and the spiral angle is greater, being more like that of the type of *C. quadrata*; it possesses twelve whorls in a length of 21 mm.

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